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ABSTRACT

The search for the best educational environment, especially in terms of class size, is an important educational issue for parents, teachers, administrators, and government officials. Parents and educators argue that smaller class size leads to more effective teaching and improved learning for students. Government officials argue that substantial reductions in class size are too costly and not effective. A review of the literature regarding small class size, defined as 14-25 students per class, found that researchers disagree on the findings of these studies, and that evidence regarding the benefits of small class size was inconclusive. This study sought to determine the effect of small class size on the reading achievement of first grade participating students. The population studied consisted of 88 first grade students at a Chicago public school, instructed in either a small class of 17 students or a large class of 27 students. The Iowa Test of Basic Skills was used to assess reading achievement of the students in each class. Results indicated that those students in the small class made greater gains in reading achievement compared to those in the larger class Contains 14 references. (SD)

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THE EFFECTIVENESS OF CLASS SIZE ON READING ACHIEVEMENT

Patricia A. Costello

Class size is a crucial issue for parents, teachers, administrators and government. Parents and educators argue that smaller class size leads to more effective teaching and improved learning for students. The government argues that substantial reductions in class size is too costly and not effective (Nye, Boyd-Zaharis, Fulton and Wallenhorst, 1992).

In a 1988 Phi Delta Kappa Gallup Poll (Folger, 1989), 77% of parents and 68% of non-parents believed that having a small class made a difference in student achievement. Even the issue of what number is the ideal class size differs from researcher to researcher. Many believe 15 is the magic number. Others have found success with greater than 15 students per class (Slavin, 1990).

If small class size does improve achievement, it should be considered no matter how costly it can be. All students have the right to the best educational setting that can be provided. The continued search for providing the best educational environment is the responsibility of all.

The controversial issue of class size has been a noteworthy educational issue since 1900. There have been many studies regarding small class size. Researchers are very interested in whether small class size improves achievement or not. There are two

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major longitudinal studies regarding class size. Various researchers disagree on the findings of these two major studies (Tomlinson, 1990). However, class size should be examined further to see if there is a lasting educational benefit.

Small class size is defined as a substantial reduction in the number of students per class. Studies regarding small class size center around a range of 14-25 students per class. These studies regarding class size vary in structure, length and conclusions (ERS, 1978). Some indicate significant results and others determine that class size does not significantly influence achievement of students because teachers do not generally teach very differently in class sizes of 15 than in larger classes. In smaller size classes many researchers have discovered that each child received more individual attention from the teacher and students paid more attention to their work. They found that the curriculum took greater depth and discipline problems diminish.

Those who are concerned chiefly with the monumental cost of small class size have suggested alternative methods. Some believe that reducing class size should be done at vital grade levels by providing an extra teacher who takes one reading or math group to reduce class size in just these critical subjects. This is more cost effective.

Various grouping methods have been proposed for the traditional classroom. These include cross-age tutoring, developmental programs, learning centers, pull-out programs, staggered or short scheduling, subject matter grouping and team teaching.

Robinson and Wittebols (1986) reviewed a large number of studies on class size. This review broke the literature down into clusters according to grade levels, subjects and so on. They found that existing research findings do not support the contention that

smaller classes will result in greater academic achievement of pupils. There is research that small classes are important to increased pupil achievement in reading and mathematics in the early primary grades. It was discovered that pupils with lower academic ability tend to benefit from smaller classes than do pupils with average ability. There was a continuous indication that the effects of class size were relatively consistent in grades K-3, slight in grades 4-8 and essentially nonexistent in grades 9-12 and that they are stronger for disadvantaged than for advantaged students. It should be noted that in the K-3 studies only 50% cited found significant differences favoring small classes. All but one of the rest found no differences. Also, counting significant differences gives no indication of the size of the class size effects.

The Educational Research Services (1978) published a review of research on the effects of class size on achievement in elementary schools. This review concluded that research on class size and achievement was inconclusive. Some of the studies cited found that small classes were better, some found that large classes were better and most found no difference.

Glass and Smith (1979) did a meta-analysis, a new approach to analyzing data, of class size research. This literature search turned up nearly 80 studies on class size. The studies date back to 1900 and involve more than 900,000 pupils. From the literature search, general comparisons were made of achievement test results. The study concluded that as class size decreases, achievement increases, particularly if class size falls below 20:1 student/teacher ratio. Only a small difference was found between

classes of 20-40 students. The authors concluded that reduced class-size can be expected to produce increased academic achievement (Glass, Cahan, Smith and Filby, 1979).

This meta-analysis of Glass and Smith was met with much controversy. Finn and Achilles (1990) reported that the meta-analysis included only a few randomized experiments of nontrivial duration in which large and small class size were within the range found in most elementary and secondary schools. The study identified 77 studies composing of larger and smaller classes which produced a total of 725 comparisons. There was found essentially no effects of class size on achievement among the 63 poorly controlled studies, so their claims concerning effects of class size on achievement depends entirely on comparison from only fourteen studies in which students were randomly assigned to larger or smaller classes.

Slavin (1989) reviewed eight well designed studies. The conclusion was that substantial reduction in class size does indeed have modest benefits among young children. However, the author noted that long term studies indicate that the effects are not cumulative across grades and may even disappear in later years. The controversy over the existence of an effect continues as well as its magnitude and whether it is more likely to accrue to student groups identified by age, gender, race or ethnic origin or ability.

Weis (1990) reviewed the results of the PRIME TIME Project. Project PRIME TIME was proposed in 1981 by former Indiana Governor Robert D. Orr. The goal was to improve the quality of the early school years by reducing class size. The Indiana General Assembly appropriated $300,000 for the 1981-82 and 1982-83 school years to

pilot PRIME TIME at the Kindergarten level in nine schools across Indiana. The funding was increased in 1983 for the 1983-84 and 1984-85 school years to $2 million. This increased funding expanded the project to include K-3 grades.

The 1982-83 report stated PRIME TIME classes exhibited steady improvement in both reading and mathematics at the K-2 grade levels. Weis (1990) stated that the 1986 PRIME TIME Report analysis of reading and mathematics scores on the IOWA Test of Basic Skills and the Stanford Achievement Test suggested that of the 40 mean comparisons, 68% favored PRIME TIME groups, 28% favored pre-PRIME TIME groups and 40% were equal. Over 40% of the statistical tests were significant. In the 1987 report, gains were reported in both reading and mathematics. The PRIME TIME teachers were trained and provided ongoing assistance. Although PRIME TIME indicates gains in achievement, it remains difficult to claim the these gains were the result of class size.

Word, Achilles, Bain, Folger, Johnston and Lintz (1990) presented the results of their Tennessee four-year longitudinal class-size project, the Student Teacher Achievement Ratio, also known as STAR. In the spring of 1985, the Tennessee legislature appropriated $3 million for this major statewide demonstration project on class size during the 1985-86 school year. Similar funding planned for the next three years also. STAR was to determine the benefits of significant reduction in pupil/teacher ratios for K-3 students. The researchers were to follow the same group of students for four years. They were to compare selected outcomes of three types of classes: small classes(13-17 students), regular classes(22-25 students) with a full-time teacher's aide,

and regular classes without an aide. Four universities-Memphis State, Tennessee State, the University of Tennessee at Knoxville and Vanderbilt- established a consortium to design the study, monitor its implementation, plan and conduct evaluations, and engage in selected research efforts. Elizabeth Ward was the project director.

Applications were received from 180 schools and 79 schools from 42 school systems were randomly chosen to participate in Project STAR. These schools had at least one class of 13 to 17 students, one class of 22-25 students with a full-time aide, and one class of 22-25 students without an aide. STAR included 128 small classes, 99 regular-sized classes with a full-time aides, and 101 regular-sized classes without aides. The students and teachers were randomly assigned to the various classes.

This study included several student variables: 1)achievement in reading and mathematics as measured by the Stanford Achievement Test(K-3); 2)mastery of the reading/language arts and mathematics objectives established under the Basic Skills First program(1-3); 3)self-concept, as measured by the Self-Concept and Motivation Inventory; 4)attendance rates; and 5)retention rates.

The data was analyzed by such demographic variables as students' race, sex and eligibility for reduced-price or free lunches and by school setting. The primary concern was to determine just what it was about small class size that leads to improved student outcomes.

The results of the STAR Project were measured and indicated a definite advantage for kindergarten students in small classes in the areas of achievement and no significant advantage for classes with a teacher aide. The first grade students

outperformed the students in regular/aide classes by significant margins on standardized tests and on the Basic Skills Criterion Tests of reading and mathematics. This was also the same for grades two and three. The highest scores in all class types were made in rural schools. The least advantage was for regular/aide classes in urban and suburban schools. These results show that small classes have an advantage over larger classes in reading and mathematics in the early primary grades (Bain and Achilles, 1986).

Achilles (1996) affirms that the Project STAR data proves that class size does make a difference in primary grades. It is also stated that the Lasting Benefits study, a study that tracked the STAR'S population, provides results that indicate students in the 8th grade who had small classes in grades K-3 remain significantly ahead of those in regular classes.

Tomlinson (1990) reviewed both the PRIME TIME and STAR Projects. The summary indicated that the PRIME TIME Project proved to be an extremely costly statewide reduction in class size and failed to meet an acceptable cost-benefit standard. The findings failed to prove that small class size benefits achievement. Teachers appear to have benefited more than the students by lighter workloads, reduced responsibility and relief from the standards of performance imposed by larger class size. The STAR Project was conducted under ideal conditions. The net benefit to achievement was a one-time, one-quarter standard deviation improvement in test scores for kindergarten or first grade students in small classes. This gain was found only in the first year of the three year study. The findings could have been influenced by the teachers' emotional responses to the project and their assignments.

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The research evidence regarding the benefits of small class size is inconclusive. Some studies have found no significant improvement in achievement for students in small classes. In contrast other studies did find significant improvement in achievement for students in small classes. However, when these studies were reviewed by other researchers it was suggested that other variables besides small class size contributed to the achievement gains.

Therefore, the purpose of the study is to determine the effect of small class size on the reading achievement of first grade participating students.

Procedures

Population/Sample:

The population in this study will include 88 first grade students. These students attend a Chicago public school. This population is composed of 37 African-American females, 28 African-American males, 13 Hispanic females and 10 Hispanic males from a lower socioeconomic background.

The school records indicate that 34 first grade students were instructed in a small class size of 17 and 54 first grade students were instructed in a large class size of 27. Thirty students were randomly selected from the small class and thirty students were randomly selected from the large class size .

Each spring the Iowa Tests of Basic Skills (ITBS) are administered to students in the Chicago Public elementary schools. Two random samples were identified from the school records that were first graders during the 1995 school year. The total reading

results of the ITBS administered during the spring of 1996 will be used in this study. The posttest only control group design will be employed.

The findings will be tabulated in terms of means and standard deviations. The t test will be employed at the .05 level of confidence to determine if there is any statistically significant difference between the mean scores.

Findings of the Study

The samples for this study included first grade students from a Chicago public elementary school. Each Spring students take the Iowa Tests of Basic Skills (ITBS). From these first grade students, two groups were randomly selected. Subjects in one group were instructed in a small class size of 17 students while the other group was instructed in a large class size of 27 students. Results from the 1995 ITBS total reading were used as a posttest.

Table I

Means, Standard Deviations, and t Tests for the Experimental Group and Control Group for Reading Achievement Scores

Reading

Test	Experimental	Control	t
	N=30	N=30	
Posttest			
M	1.20	1.62	3.0
SD	.32	.73	

df=28
Test t at .05 level
Table t = 2.048
3.00 > 2.048

The purpose of this study was to determine if small class size affected reading achievement. A t test (.05) for the independent samples was done on this set of scores to determine if there was a statistically significant difference in reading achievement. Table I summarizes the statistical analyses.

Table I indicates that there is a statistically significant difference at the .05 confidence level in reading scores on the ITBS of students instructed in a small class size and students instructed in a large class size. Therefore, the data leads to the rejection of the null hypothesis that first grade students taught in a small class size will not obtain significantly different reading achievement scores on the Iowa Test of Basic Skills from those taught in a large class size.

The results of research findings in this study indicate that small class size does affect reading achievement at the first grade level on the Iowa Test of Basic Skills. However, the review of literature was inconclusive. Some studies (Slavin, 1989) did indicate significant achievement for students and other studies indicated no significant achievement (Tomlinson, 1990).

The research findings in this study appear to be consistent with the findings of Achilles (1996) and Weis (1990). These two research studies indicate findings that small class size provides an advantage over large class size in the area of reading achievement.

Perhaps more school districts should provide the money necessary to implement smaller class size in schools. It could be implemented at the primary grade levels and studied to see if it makes a significant difference in student achievement.

The results of this study suggests that small class size affects reading achievement at the first grade level and two longitudinal studies also provide findings that indicate small class size does affect achievement (Word, 1990).

The widespread use of large class size will probably continue because of the lack of appropriate funding to implement smaller class size. Until schools are funded appropriately, students will continue to be instructed in large size classes.

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